

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:	)	
	)	
Jin-Ook KIM	)	Confirmation No. 7617
	)	
Application No.: 10/840,240	)	Group Art Unit: 1742
	)	
Filed: May 7, 2004	)	Examiner: Yi, Stella Kim
	)	
For: METHOD OF FORMING COLOR FILTER)	)	<b>Mail Stop Appeal Brief Patents</b>
LAYER AND METHOD OF	)	
FABRICATING LIQUID CRYSTAL	)	

Commissioner for Patents  
**Mail Stop Appeal Brief Patents**  
Alexandria, VA 22314

Sir:

**APPELLANT'S BRIEF UNDER 37 C.F.R. § 41.37**

This brief is in furtherance of the Notice of Appeal filed in the above-identified patent application on February 25, 2011. A fee of \$540.00 required under 37 C.F.R. §41.20(b)(2) is being filed concurrently herewith.

**1. The Real Party in Interest**

The real party in interest in this appeal is LG Display Co., Ltd.

**2. Related Appeals and Interferences**

Appellant is not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

**3. Status of Claims**

The status of the claims is as follows upon filing of this Appeal Brief:

Claims pending: 1-20

Claims objected to: None

Claims allowed: None

Claims withdrawn: None

Claims rejected: 1-20

The claims on appeal are 1-20.

**4. The Status of Amendments**

Appellant filed a Request for Reconsideration on April 2, 2008, in which no claims were amended.

Appellant subsequently filed an Amendment on November 12, 2008 in which claims 1, 11 and 16 were amended.

Appellant subsequently filed an Amendment for Entry with RCE filing on May 11, 2009 in which claims 1 and 16 were amended.

Appellant subsequently filed an Amendment on August 31, 2009 in which claims 1, 11 and 16 were amended.

Appellants subsequently filed an Amendment for Entry with RCE filing on March 16, 2010 in which claims 1, 11 and 16 were further amended.

Appellants subsequently filed an Amendment on July 20, 2010 in which claims 1, 11 and 16 were further amended.

Appellants subsequently filed a Supplemental Amendment on September 16, 2010 in which no claims were amended.

Appellants subsequently filed an Amendment on January 24, 2011 in which claims 1, 11 and 16 were amended.

No further amendments of the claims were made during the prosecution of the subject application up to the filing of the Notice of Appeal on February 25, 2011. All claim amendments presented during prosecution have been entered. As such, Appellant submits that claims 1-20 are the currently pending claim of record. Claims 1-20 listed in the claims appendix herein reflect the cumulative claim amendments of the aforementioned Amendments.

## **5. Summary of Claimed Subject Matter**

An aspect of Appellant's present invention relates generally to a method of forming a color filter layer for a liquid crystal display device.

In accordance with the exemplary embodiment of the invention as recited in independent claim 1, and as shown in FIGs. 3A-5B, and described in the Specification at paragraphs [0031]-[0046], a method of forming a color filter layer comprises:

forming a first sub-color filter 104 (of FIG. 3D) on a substrate 100 by placing a first mold 200 having at least a first groove "A1" on the substrate 100 such that the first groove "A1" and the substrate 100 constitute a first channel "CH1" and injecting a first color resin 102 into the first channel "CH1" for a first time, the substrate 100 including first, second and third regions "P<sub>R</sub>", "P<sub>G</sub>" and "P<sub>B</sub>", and the first groove "A1" corresponding to the first region "P<sub>R</sub>", wherein injecting the first color resin 102 into the first channel "CH1" is performed after placing the first mold 200 on the substrate 100;

forming a second sub-color filter 108 (of FIG. 4D) on the substrate 100 by placing a second mold 202 having at least a second groove "A2" on the substrate 100 such that the second groove "A2", the first sub-color filter 104 and the substrate 100 constitute a second channel "CH2" and injecting a second color resin 106 into the second channel "CH2" for a second time, the second groove "A2" corresponding to the first and second regions "P<sub>R</sub>" and "P<sub>G</sub>", the first sub-color filter 104 used as one sidewall of the second channel "CH2" and the second mold 202 used as the other sidewall of the second channel "CH2" while injecting the second color resin 106, wherein injecting the second color resin 106 into the second channel "CH2" is performed after placing the second mold 202 on the substrate 100; and

forming a third sub-color filter 110 (of FIG. 5C) on the substrate 100 by placing a third mold 204 having at least a third groove "A3" on the substrate 100 such that the third groove "A3", the first sub-color filter 104, the second sub-color filter 108 and the substrate 100

constitute a third channel “CH3” and injecting a third color resin 110 into the third channel “CH3” for a third time, the third groove “A3” corresponding to the first, second and third regions “P<sub>R</sub>”, “P<sub>G</sub>” and “P<sub>B</sub>”, the second sub-color filter used as one sidewall of the third channel “CH3” and the third mold 204 used as the other sidewall of the third channel “CH3” while injecting the third color resin 110, wherein injecting the third color resin 110 into the third channel “CH3” is performed after placing the third mold 204 on the substrate 110, wherein the second groove “A2” has a volume greater than the first groove “A1” and smaller than the third groove “A3”.

In accordance with the exemplary embodiment of the invention as recited in independent claim 11, and as shown in FIGs. 3A-5B, and described in the Specification at paragraphs [0031]-[0046], a method of forming a color filter layer comprises:

attaching a first mold 200 having at least a first groove “A1” on a substrate 100 and forming a first channel “CH1” by the first groove “A1” and the substrate 100, and filling the first channel “CH1” with a first color resin 102 for a first time to form a first sub-color filter 104 after attaching the first mold 200 on the substrate 100;

attaching a second mold 202 having at least a second groove “A2” on the substrate 100 and forming a second channel “CH2” by the second groove “A2”, the first sub-color filter 104 and the substrate 100, and filling the second channel “CH2” with a second color resin 106 for a second time to form a second sub-color filter 108 after attaching the second mold 202 on the substrate 100, the first sub-color filter 104 used as one sidewall of the second channel “CH2” and the second mold 202 used as the other sidewall of the second channel “CH2” while filling the second channel “CH2” with the second color resin 106; and

attaching a third mold 204 having at least a third groove “A3” on the substrate 100 and forming a third channel “CH3” by the third groove “A3”, the first sub-color filter 104, the second color-filter 108 and the substrate 100, and filling the third channel “CH3” with a third color resin 110 for a third time to form a third sub-color filter 112 after attaching the third mold 204 on the substrate 100, the second sub-color filter 108 used as one sidewall of the third channel “CH3” and the third mold 204 used as the other sidewall of the third channel “CH3” while filling the third channel “CH3” with the third color resin 110 wherein the second groove “A2” has a volume greater than the first groove “A1” and smaller than the third groove “A3”.

In accordance with the exemplary embodiment of the invention as recited in independent claim 16, and as shown in FIGs. 3A-6, and described in the Specification at paragraphs [0031]-[0051], a method of fabricating a color filter substrate for a liquid crystal display device, comprises forming a black matrix 101 on a substrate 100 having first, second and third regions “P<sub>R</sub>”, “P<sub>G</sub>” and “P<sub>B</sub>”, attaching a first mold 200 having a first groove “A1” on the substrate 100, the first groove “A1” corresponding to the first region “P<sub>R</sub>”, wherein the first groove “A1” and the substrate 100 constitute a first channel “CH1”; filling the first channel “CH1” with a first color resin 102 for a first time to form a first sub-color filter 104 after attaching the first mold 200 on the substrate 100; curing the first sub-color filter 104; detaching the first mold 104 from the substrate 100; attaching a second mold 202 having a second groove “A2” on the substrate 100, the second groove “A2” corresponding to the first and second regions “P<sub>R</sub>” and “P<sub>G</sub>”, wherein the second groove “A2”, the first sub-color filter 104 and the substrate 100 constitute a second channel “CH2”; filling the second channel “CH2” with a second color resin 106 for a second time to form a second sub-color filter 108 after attaching the second mold 202 on the

substrate 100, the first sub-color filter 104 used as one sidewall of the second channel "CH2" and the second mold 202 used as the other sidewall of the second channel "CH2" while filling the second channel "CH2" with the second color resin 106; curing the second sub-color filter 108; detaching the second mold 202 from the substrate 100; attaching a third mold 204 having a third groove "A3", on the substrate 100, the third groove "A3" corresponding to the first, second and third regions "P<sub>R</sub>", "P<sub>G</sub>" and "P<sub>B</sub>", wherein the third groove "A3", the first sub-color filter 104, the second sub-color filter 108 and the substrate 100 constitute a third channel "CH3", and wherein the second groove "A2" has a volume greater than the first groove "A1" and smaller than the third groove "A3"; filling the third channel "CH3" with a third color resin 110 for a third time to form a third sub-color filter 112 after attaching the third mold 204 on the substrate 100, the second sub-color filter 108 used as one sidewall of the third channel "CH3", and the third mold "CH3" used as the other sidewall of the third channel "CH3" while filling the third channel "CH3" with the third color resin 110; curing the third sub-color filter 112; detaching the third mold 204 from the substrate 100; and forming a common electrode 114 on a color filter layer 120 including the first, second and third sub-color filters 104, 108 and 112.

**6. Grounds of Rejection to be Reviewed on Appeal**

Whether claims 1-20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Nishikawa et al. (US 6,063,527) and in view of XIA et al. ("Soft Lithography." Angew. Chem. Int. Ed., 1998, pp. 550-575) and in further view of Song et al. (US 2001/0019382).

7. **Argument**

Appellant respectfully asserts that the rejection under 35 U.S.C. §103(a) is improper and should be reversed.

**A. Independent Claims 1, 11 and 16**

With respect to each of independent claims 1 and 11, Appellant respectfully asserts that the applied references, whether taken individually or in combination, fail to teach or disclose a claimed method of forming a color filter layer including, in part, "... the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the second channel while injecting the second color resin," and "... the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while injecting the third color resin."

With respect to independent claim 16, Appellant respectfully asserts that the applied references, whether taken individually or in combination, fail to teach or disclose a claimed method of fabricating a color filter substrate for a liquid crystal display device including, in part, "... the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the second channel while injecting the second color resin," and "... the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while injecting the third color resin."

The Final Office Action concedes on Page 7 that "Modified NISHIKAWA et al. by XIA et al. is silent to the first and second color filters being used as a sidewall for the next color filters," but alleges that "SONG et al. teach that liquid crystal display devices are made of red,



green, and blue color filters that are arranged in a stripe shape as illustrated in Figure 5 (Page 3, [0040]).” Appellant respectfully disagrees.

Appellant respectfully notes that none of the applied references teaches or discloses the feature of “the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the second channel while injecting the second color resin.” (Emphasis Added). Appellant respectfully submits that Song et al. cannot remedy the deficiencies of Nishikawa and XIA because Song et al. is completely silent about the feature of “the first sub-color filter used as one sidewall ... while injecting the second color resin.” In fact, in Song et al., each of sub-color filters is formed by patterning the resin using the photolithograph process as illustrated in FIGs. 6A and 6B and as further described in [0043], and then are merely arranged in a stripe shape as shown in FIG. 5. In other words, Song et al. discloses a totally different process from the claimed invention.

Moreover, the Final Office Action concedes on Page 7 that “Modified NISHIKAWA et al. by XIA et al. is silent to the second and third mold used as the other sidewalls of the channels,” but simply states in 2nd paragraph of Page 7 that “NISHIKAWA et al. modified by XIA et al. teach the micromolding in capillaries for the technology of microfabrication to provide a convenient and inexpensive method to pattern small or large surfaces of substrates and that it would be have been obvious to one of ordinary skill in the art to use the said PDMS mold three times or use three PDMS molds in order to form three different sub-color filters with three different color resins, as required by NISHIKAWA et al. to produce the said stripe shape of SONG et al. where the sidewalls of each color-filters are touching.” Appellant respectfully disagrees.

First, as noted above, Appellant respectfully submits that the sub-color filters in a stripe shape of Song et al. are formed by a photolithograph process, which is totally different from the process claimed by each of independent claims 1, 11 and 16. Second, as pointed out in MPEP [2142], “[t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of reason(s) why the claimed invention would have been obvious,” and “rejection on obviousness cannot be sustained with mere conclusory statement; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” In *re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). Appellant respectfully submits that the Final Office Action lacks the clear articulation of reasons why the features of “the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while injecting the third color resin” are obvious. MPEP [2142] further points out that “[k]nowledge of applicant’s disclosure must be put aside in reaching this determination, ... impermissible hindsight must be avoid and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.” Thus, Appellant respectfully requests that the Office provide the factual supporting for its determination.

In the Advisory Action issued February 4, 2011, the Examiner alleges on page 2 that “SONG teach in paragraph [0040] and in Fig. 5 a first process step wherein the color filters are arranged in a strip shape and each stripe is placed in contact/side-by-side from one another prior to fabricating the stripe shape wherein photolithography is used to etch away part of the color filter as illustrated in Figs. 6A and 6B.” Then, the Examiner further alleges that “the photolithography step does not occur until after the color filters are arranged in a stripe shape, but to first arrange such color filters in such stripe shape.” Appellant respectfully disagrees.

For example, FIG. 5 of Song et al. merely discloses strip shaped color filters fabricated through steps of FIGs. 6A and 6B of Song et al. In other words, the strip shaped color filters of FIG. 5 of Song et al. are obtained through the photolithographic steps of Figs. 6A and 6B of Song et al. Therefore, the strip shaped color filters of Song et al. are fabricated through a totally different process.

To establish a *prima facie* obviousness, there must be a finding that the prior art included each element claimed, a finding that one of ordinary skill in the art could have combined the elements as claimed by known methods, and that one of ordinary skill in the art would have recognized that the results of the combination were predictable. MPEP §2143(A). Appellant respectfully submits that Hishikawa, XIA and Song et al., whether taken individually or in combination, fail to teach or disclose the above claimed features in each of independent claims 1, 11 and 16, and therefore Appellant respectfully asserts that the Final Office Action fails to establish a *prima facie* case of obviousness with regard to independent claims 1, 11 and 16, and the Section 103 rejection of independent claims 1, 11 and 16 should be withdrawn.

#### B. Conclusion

Because Hishikawa, XIA and Song et al., whether taken alone or in combination, fail to teach or suggest each feature of independent claims 1, 11 and 16, the rejection under 35 U.S.C. § 103(a) should be withdrawn. Furthermore, claims 2-10, 12-15 and 17-20 depend from independent claims 1, 11 and 16, respectively. Accordingly, claims 2-10, 12-15 and 17-20 are also allowable because of the additional features they recite and the reasons stated above.

In view of the foregoing, Appellant respectfully requests the reversal of the Examiner's rejections and the allowance of the pending claim. If there are any other fees due in connection with the filing of this Appellant's Brief, please charge the fees to our Deposit Account No. 50-0310.

If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0310.

Respectfully submitted,

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**8. Claims Appendix**

Subsequent to entry of the Amendment filed on January 24, 2011, the claims read as follows:

Claim 1 (Rejected): A method of forming a color filter layer, comprising:

forming a first sub-color filter on a substrate by placing a first mold having at least a first groove on the substrate such that the first groove and the substrate constitute a first channel and injecting a first color resin into the first channel for a first time, the substrate including first, second and third regions and the first groove corresponding to the first region, wherein injecting the first color resin into the first channel is performed after placing the first mold on the substrate;

forming a second sub-color filter on the substrate by placing a second mold having at least a second groove on the substrate such that the second groove, the first sub-color filter and the substrate constitute a second channel and injecting a second color resin into the second channel for a second time, the second groove corresponding to the first and second regions, the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the second channel while injecting the second color resin, wherein injecting the second color resin into the second channel is performed after placing the second mold on the substrate; and

forming a third sub-color filter on the substrate by placing a third mold having at least a third groove on the substrate such that the third groove, the first sub-color filter, the second sub-color filter and the substrate constitute a third channel and injecting a

third color resin into the third channel for a third time, the third groove corresponding to the first, second and third regions, the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while injecting the third color resin, wherein injecting the third color resin into the third channel is performed after placing the third mold on the substrate wherein the second groove has a volume greater than the first groove and smaller than the third groove.

Claim 2 (Rejected): The method according to claim 1, wherein the first color resin is injected through an opening of the first groove, the second color resin is injected through an opening of the second groove, and the third color resin is injected through an opening of the third groove.

Claim 3 (Rejected): The method according to claim 1,

wherein the forming the first sub-color filter on the substrate further comprises:

curing the first color resin with one of heat and light; and

detaching the first mold from the substrate,

wherein the forming the second sub-color filter on the substrate further comprises:

curing the second color resin with one of heat and light; and

detaching the second mold from the substrate, and

wherein the forming the third sub-color filter on the substrate further comprises:

curing the third color resin with one of heat and light; and

detaching the third mold from the substrate.

Claim 4 (Rejected): The method according to claim 1, wherein the first mold, the second mold and the third mold include a transparent material.

Claim 5 (Rejected): The method according to claim 1, wherein the second groove covers the first sub-color filter when the second mold is placed on the substrate.

Claim 6 (Rejected): The method according to claim 1, wherein the third groove covers the first and second sub-color filters when the third mold is placed on the substrate.

Claim 7 (Rejected): The method according to claim 1, wherein the first, second and third sub-color filters have one of stripe shape, round shape and zigzag shape.

Claim 8 (Rejected): The method according to claim 1, further comprises forming a black matrix over the substrate.

Claim 9 (Rejected): The method according to claim 1, wherein the first, second and third regions correspond to pixel regions of a liquid crystal device.

Claim 10 (Rejected): The method according to claim 1, wherein the first, second and third color resins are injected by a capillary force.

Claim 11 (Rejected): A method of forming a color filter layer, comprising:

attaching a first mold having at least a first groove on a substrate and forming a first channel by the first groove and the substrate;

filling the first channel with a first color resin for a first time to form a first sub-color filter after attaching the first mold on the substrate;

attaching a second mold having at least a second groove on the substrate and forming a second channel by the second groove, the first sub-color filter and the substrate;

filling the second channel with a second color resin for a second time to form a second sub-color filter after attaching the second mold on the substrate, the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the second channel while filling the second channel with the second color resin;

attaching a third mold having at least a third groove on the substrate and forming a third channel by the third groove, the first sub-color filter, the second color-filter and the substrate; and

filling the third channel with a third color resin for a third time to form a third sub-color filter after attaching the third mold on the substrate, the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while filling the third channel with the third color resin wherein the second groove has a volume greater than the first groove and smaller than the third groove.



Claim 12 (Rejected): The method according to claim 11, wherein the first mold, the second mold and the third mold include a transparent material.

Claim 13 (Rejected): The method according to claim 11, further comprises:

- curing the first sub-color filter with one of heat and light;
- detaching the first mold from the substrate;
- curing the second sub-color filter with one of heat and light;
- detaching the second mold from the substrate;
- curing the third sub-color filter with one of heat and light; and
- detaching the third mold from the substrate.

Claim 14 (Rejected): The method according to claim 11, wherein the first, second and third channels are filled by a capillary force.

Claim 15 (Rejected): The method according to claim 11, wherein a volume of the first groove is substantially the same as a volume of the first sub-color filter, a volume of the second groove is substantially the same as a sum of volumes of the first and second sub-color filters, and a volume of the third groove is substantially the same as a sum of volumes of the first, second and third sub-color filters.

Claim 16 (Rejected): A method of fabricating a color filter substrate for a liquid crystal display device, comprising:

forming a black matrix on a substrate having first, second and third regions;

attaching a first mold having a first groove on the substrate, the first groove corresponding to the first region, wherein the first groove and the substrate constitute a first channel;

filling the first channel with a first color resin for a first time to form a first sub-color filter after attaching the first mold on the substrate;

curing the first sub-color filter;

detaching the first mold from the substrate;

attaching a second mold having a second groove on the substrate, the second groove corresponding to the first and second regions, wherein the second groove, the first sub-color filter and the substrate constitute a second channel;

filling the second channel with a second color resin for a second time to form a second sub-color filter after attaching the second mold on the substrate, the first sub-color filter used as one sidewall of the second channel and the second mold used as the other sidewall of the third channel while filling the second channel with the second color resin;

curing the second sub-color filter;

detaching the second mold from the substrate;

attaching a third mold having a third groove on the substrate, the third groove corresponding to the first, second and third regions, wherein the third groove, the first sub-color filter, the second sub-color filter and the substrate constitute a third channel,

and wherein the second groove has a volume greater than the first groove and smaller than the third groove;

filling the third channel with a third color resin for a third time to form a third sub-color filter after attaching the third mold on the substrate, the second sub-color filter used as one sidewall of the third channel and the third mold used as the other sidewall of the third channel while filling the third channel with the third color resin;

curing the third sub-color filter;

detaching the third mold from the substrate; and

forming a common electrode on a color filter layer including the first, second and third sub-color filters.

Claim 17 (Rejected): The method according to claim 16, wherein the first mold, the second mold and the third mold include a transparent material.

Claim 18 (Rejected): The method according to claim 17, wherein the transparent material includes polydimethylsiloxane (PDMS).

Claim 19 (Rejected): The method according to claim 16, wherein the first sub-color filter is cured by irradiating light through the first mold, the second sub-color filter is cured by irradiating light through the second mold, and the third sub-color filter is cured by irradiating light through the third mold.

Claim 20 (Rejected): The method according to claim 16, wherein the first, second and third regions correspond to pixel regions of the liquid crystal device.

**9. Evidence Appendix**

No information is appended under this section.

**10. Related Proceedings Appendix**

No information is appended under this section.